

# **BIOLOGICAL ASSESSMENT AND EVALUATION**

## **Yeager Canyon Log Jam Removal**

**MOGOLLON RIM RANGER DISTRICT  
COCONINO NATIONAL FOREST  
COCONINO COUNTY**

## Project Background

A log jam has formed at the culvert where Forest Road (FR) 96 crosses Yeager Canyon (Figure 1). The debris field is about 100' wide by 50' long and between 2' and 6' deep and formed primarily from a 25-year storm event in early 2019 (Figures 2a and 2b). A similar or even smaller storm event could dislodge the log jam and block the culvert, forcing FR 96 to act as a dam across Yeager Canyon rather than letting water pass under the road via the culvert. If this happens, water could overtop the road surface, wash out the road, damage or destroy the existing culvert, and cause other morphologic damage to the stream channel. This could likely result in the long-term (2-3 years) or permanent closure of FR 96 at Yeager Canyon.

Precipitation events during the winter and spring of 2018-2019 resulted in a similar problem at the FR95 crossing of Bear Canyon about 5 miles from Yeager Canyon. The large culvert there was blocked by debris and a section of road washed out, resulting in a 40-foot deep gap at the crossing. FR 95 was closed at the crossing, and estimates to repair the damage are at least approximately half of a million dollars. Bear Canyon was the last canyon that FR 95, a popular access road to FR 300, or Rim Road, crossed before meeting FR 300. The road closure increased firefighting response time to some areas formerly accessed directly by FR95 by more than an hour. In addition the expense to bring nearby roads up to level 3 status for logging access will be considerable, travel time for both forest visitors and logging trucks from some areas will be increased by an hour. This washout event degraded important Little Colorado spinedace habitat downstream of the crossing, including filling in a 5' deep pool immediately below the culvert and many smaller pools further downstream with sediment.

The potential washout of FR 96 in Yeager Canyon poses similar problems to what we have seen with the FR 95 event. The FR 96 is a level 3 road (typically maintained for passenger vehicles) that provides the most direct access to the eastern quarter of the Mogollon Rim on the Coconino National Forest. The closure of the road at Yeager Canyon would not eliminate access to any areas of the forest, but travel times would be extended from 30 minutes to several hours for various parts of the forest. Among other problems, this extension of travel time will:

- Increase annual road maintenance expenses because road surfacing material harvested from existing and potential material sources must be transported much farther to be delivered to eastern roads
- Increase the cost of forest management operations due to increased travel time to remove forest products.
- Complicate recreational access for people using the impacted area, including increasing traffic on the already busy FR 300
- Increase catastrophic fire hazards because wildfire starts could more easily spread to uncontrollable size before responding firefighters arrive

Furthermore, there are several pools below the 96 road that are occupied by spinedace. These pools remained wet and occupied even as many Mogollon Rim streams dried completely during recent dry summers which makes the pools an extremely valuable refugia for native fish populations. Based on observations of the FR 95/Bear Canyon washout, it's likely that the spinedace pools could be filled in with sediment from the road bed should there be a similar event affecting FR 96. Though future high flow events may eventually scour out (remove fine sediments) the pools again, they would be unavailable as refugia, possibly for years. This puts the native fish populations of Yeager Canyon at risk of extirpation in future drought years.

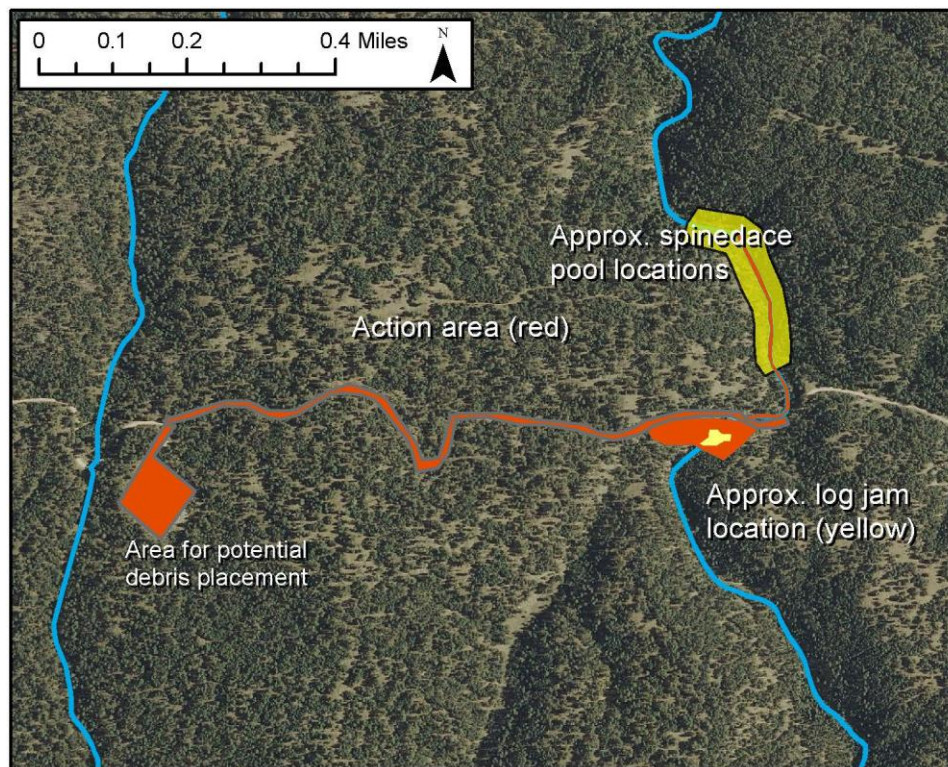


Figure 1. Map of the log jam in Yeager Canyon, showing the location of the log jam in Yeager Canyon, Forest Road 96, Lockwood pit (potential source for road materials), the location of occupied spinedace habitat, and where debris removed from the log jam may be placed.







Figure 2. Images of the log jam in Yeager Canyon. 2a and 2b show the log jam on the south side of FR 96 from western and eastern aspects, respectively. 2c shows the potential ramp location on the eastern side of FR 96 (the culvert is in the center left of the image, and FR 96 is the flat surface top right of the image). 2d shows the potential ramp location on the western side of FR 96 as seen from the surface of the road.

## Project Proposal

The scope of this project is to prevent the risk for damage to FR96 and aquatic habitat in Yeager Canyon by removing the debris from Yeager Canyon. This will require 1) temporary closure of FR96 at Yeager Canyon, 2) constructing a dirt ramp into the canyon from FR96, 3) collecting and bundling the debris with an excavator, 4) hauling the debris out of the canyon with a skid steer, 5) cutting large logs into smaller pieces, 6) hauling the debris out of the canyon with a dump trailer, 7) piling the debris out of the canyon for future burning, and 8) blocking and rehabilitation of the ramp to prevent public access.

National Environmental Policy Act (NEPA) requirements for this project are being completed under Categorical Exclusion (FSH 1909.15 Chapter 30, 36 CFR 220.6 (d) (4)).

### *Action Area and Timing*

This project would occur on the south (upstream) side of FR 96 in Yeager Canyon. The action area is shown in red in Figure 1, and encompasses 4 acres in or near the stream channel (including 500m downstream for potential sediment effects) and 46 acres (FR 96 and Lockwood Pit) where trees will be hauled and then piled for burning or decomposition. To ensure public safety, FR 96 would be closed while heavy equipment is working on this project. The work will be conducted in fall 2020 after the 2020 Mexican Spotted Owl breeding season ends on August 31st.

### *Ramp Construction*

The debris must be accessed from southern side of FR 96 in Yeager Canyon, which currently is too steep for vehicles to enter the canyon. To provide safe access for heavy equipment to enter and exit, a ramp will be built using existing native material onsite or material imported from Lockwood pit. This road will be as long as necessary to create an appropriate slope to allow access for the debris removal equipment. The equipment operator will determine whether the east (Fig 1c) or west (Fig 1d) side of Yeager Canyon is safest for construction of the ramp. Depending on the safest location for the ramp, a few trees may need to be removed to clear enough space. No more than five trees will be removed, and diameter at breast height will be less than 18 inches.

Material (soil and rock) for the ramp will be harvested from Lockwood Pit, about ½ mile west of Yeager Canyon on FR 96 (for example, with a skid steer or excavator) and transported to the ramp site. The ramp will be built by placing the dirt and rock on the south side of FR 96 and compacting the material with construction equipment. The ramp will be wide enough to safely accommodate the construction equipment (about 12 feet wide at the driving surface) and long enough so that the slope can be safely used by both vehicles. The length of the ramp will depend on which side of the stream is selected by the operator, but is expected to be less than 100' long.

#### *Debris Removal and Storage*

To access the debris, equipment will drive down the ramp and into the stream channel. To reduce sediment disturbance once off FR 96, the equipment will be operated in a manner to minimize movement except as necessary to extract the debris. Debris will be lifted and placed into a bundle. Some of the logs in the debris field are too large for mechanical equipment to safely move. As the operator finds these logs, they will be cut into smaller pieces by a sawyer crew. The log bundles may be chained or tied together so that the logs can be moved as a group. The logs will be hauled to FR 96 by mechanical equipment, either by lifting a bundle with a bucket or fork lift attachment and driving up the ramp or by dragging a bundle up the ramp. The logs will be placed into the transport vehicle on FR 96 and hauled to Lockwood pit and will be either stacked for future burning or made available for other purposes, such as firewood collection.

In addition to log jam debris, there are box elder trees on either side of the culvert, visible in figure 1c. Branches from these trees partially occlude the culvert and potentially catch debris moving through the culvert. These trees will either be trimmed or removed with chain saws.

#### *Soil Disturbance and Ramp Rehabilitation*

We anticipate a limited amount of soil disturbance from the activity of heavy equipment in the stream channel and between the stream channel and the ramp. Disturbed soil in and around the stream channel will be smoothed or graded close to its original state with the construction equipment. Compacted areas outside of the stream channel will be scarified several inches deep, seeded with native grass seed, and covered with slash (perhaps smaller debris from the debris field) to cover and protect disturbed soil. The ramp will be left in place so that it can be used to remove future debris flows. Public use of the ramp will be prevented by placing large boulders and other natural material barriers on the ramp. The surface of the ramp will also be scarified for at least several inches and seeded with native grasses, then be covered with slash to reduce erosion and enable vegetation growth.

## Species Identification

The 2013 Regional Forester's Sensitive Species list, along with the Forest and District Threatened, Endangered, and Sensitive Plants, Fish and Wildlife lists were reviewed for species information. Additionally, the biologist reviewed wildlife sighting information and other literature to add appropriate species to the list.

This biological assessment will analyze project effects on spinedace and its critical habitat and Mexican spotted owl (MSO) and its critical habitat.

## Species Evaluation

### Little Colorado Spinedace, *Lepidomeda vittata*

Little Colorado spinedace (*Lepidomeda vittata*) is currently listed as threatened under the ESA (USFWS 1987). Critical habitat was designated for the species on September 16<sup>th</sup>, 1987, the recovery plan was completed in 1998, and the recovery plan, including delisting criteria is currently being updated and modified (USFWS 2019).

### Data Sources, Including Surveys Conducted

Mogollon Rim streams are surveyed by AGFD and FWS, and comprehensive AGFD surveys are summarized in USFWS 2019. Spinedace are known to occupy Yeager Canyon based on visits to the site in 2019. Additionally, spinedace were translocated from pools in Yeager Canyon below FR96 into several other Mogollon Rim streams in 2019.

### Affected Habitat Description

Little Colorado spinedace inhabit medium to small streams and are characteristically found in pools with water flowing over fine gravel and silt-mud substrates (USFWS 2008). These streams are often seasonally intermittent, at which times the Little Colorado spinedace persists in the deep pools and spring areas that retain water. During flooding the spinedace redistributes itself throughout the stream. Spawning primarily occurs in early summer, but some spawning continues until early fall. Typical habitat ranges in elevation from 4,000 to 8,000 feet. Spinedace feed on aquatic invertebrates.

Historically this species was found throughout the upper portions of the Little Colorado River and its north-flowing permanent tributaries on the Mogollon Rim and the northern slopes of the White Mountains in eastern Arizona (USFWS 2008). Currently, spinedace are known to occur in portions of tributaries of East Clear Creek, West Chevelon and Chevelon Creeks, Nutrioso Creek, Rudd Creek, and the Little Colorado River. Occupied East Clear Creek tributaries include Dane Canyon, Bear Canyon, Leonard Canyon, West Leonard Canyon, Yeager Canyon, and recent stockings into Barbershop Canyon and Miller Canyon.

The proposed action occurs in Yeager Canyon upstream of the crossing of FR 96. While spinedace have the potential to occupy much of Yeager Canyon, Yeager often dries to an intermittent stream in summer and recent drought has further reduced surface flow. In middle and late fall there is typically no surface water at or near the crossing in Yeager Canyon, and this work will only occur when the stream channel upstream of FR 96 at the log jam is dry. However, there are currently three pools in Yeager Canyon downstream of FR 96 that are occupied by spinedace. These pools appear to be perennial as they have remained wet and occupied by spinedace during recent droughts, and there is intermittent surface water flow between the pools. The nearest pool to the FR 96 crossing is a little less than 350m downstream of the crossing, and there typically is no surface water flow between the crossing and the pool when this work will occur.

### *Critical Habitat*

Yeager Canyon is not within critical habitat but is a tributary of East Clear Creek, which is spinedace critical habitat. The confluence of Yeager Canyon and East Clear Creek is about 3.7 stream miles downstream of the crossing of FR 96 on Yeager Canyon (the action area).

### *Analysis of Effects, Including Cumulative Effects*

Because there is no surface water at the site and consequently no spinedace at the site, individual spinedace will not be directly impacted by the proposed action. The potential effects of this action are therefore to aquatic habitat, primarily in the form of increased sedimentation.

Several aspects of the proposed action have the potential to increase sedimentation into Yeager Canyon. The new ramp will increase the surface area of impermeable road surface, which can allow water to move faster and increase erosion rates next to the road. The ramp surface itself could also erode and become a sediment source. Operating construction equipment alongside and in the stream channel is going to disrupt the ground vehicles operate on. This both exposes soil to erosion that was previously covered by vegetation and reduces surface roughness. These two changes allow runoff water to move faster over exposed soil, increasing the sediment that enters the stream channel. Soil compressed by the weight of construction vehicles shows reduced vegetation growth, increasing time that soil is exposed for erosion.

This potential increase in sedimentation will be mitigated by implementing rehabilitating impacted soils as described in the *Soil Disturbance and Ramp Rehabilitation* section above. In particular, any habitat that was impacted by construction equipment, including the ramp, will be rehabilitated by scarifying compacted sediment, spreading a native seed mix over the area, and covering the exposed sediment with slash. The slash will reduce short-term erosion by slowing water and protecting exposed soil, and seeding will provide long-term rehabilitation by boosting ground cover recovery. While rehabilitation actions are not expected to prevent *all* sediment from reaching the stream channel, they will reduce the sediment entering the stream to insignificant amounts.

Construction equipment leaking fluids could negatively impact water quality, however this potential pollution source will be mitigated by checking equipment for leaks and not servicing equipment while in the stream channel.

The work in the channel is going to move large woody debris and potentially dislodge rocks and other habitat features. This may affect the current state of aquatic habitat from what it would otherwise look like when the stream is wet.

Spinedace critical habitat is more than 3.5 stream miles downstream, which provides many natural opportunities for sediment to settle out or be trapped in riparian vegetation. We do not expect any measureable change in sediment load or change in water quality coming out of Yeager Canyon into East Clear Creek as a result of this action.

Finally, the potential negative effects of not taking the proposed action should be considered. Based on how far sediment traveled during the FR 95 culvert failure (more than 500m), it is very likely that the spinedace pools below the FR 96 crossing would experience extremely high sedimentation from the road material washing downstream if the crossing washed out. As mentioned above, this material could fill in the three existing pools, which might negatively affect or eliminate these spinedace and put the native fish populations of Yeager Canyon at risk of extirpation in future drought years.

Cumulative effects include effects of future state or private actions that are reasonably certain to occur within the project area. Because there are no future tribal, state or private actions reasonably foreseeable to occur within the project area, it is not anticipated that there would be cumulative effects to spinedace or spinedace critical habitat.

### Determination of Effects and Recommended Mitigation

This action will occur in the stream channel of a stream that supports spinedace. Short-term negative effects may include storm runoff carrying sediment into Yeager Canyon. Mitigation measures include working when the stream channel is dry, minimizing equipment movement in the channel, servicing equipment outside of the stream channel, and rehabilitation of disturbed soil and the ramp.

Given the mitigation measures described above, sedimentation levels are expected to be well under that which could affect spinedace and their suitable habitat in Yeager Canyon and critical habitat in East Clear Creek. Long-term positive effects include reducing the likelihood of Yeager Canyon FR 96 culvert failing and damaging spinedace habitat. Therefore, combined with cumulative effects, it is the determination that the proposed action *may affect but would not likely adversely affect the spinedace, its habitat or its critical habitat*.

### Mexican Spotted Owl, *Strix occidentalis lucida*

#### Data Sources, Including Surveys Conducted

The proposed action will occur within the northern boundary of the Yeager Mexican spotted owl (MSO) protected activity center (PAC). No other MSO PACs occur within the action area, but designated recovery habitat does occur within the action area. No recent MSO surveys have occurred in the action area, but surveys did occur between 1991 and 1995 and in 2000. Results of these surveys are listed in Table 1.

Table 1. Survey results for the Yeager PAC and surrounding vicinity

PAC Name	Year Surveyed	Survey Results (Group type, reproductive status)
Yeager	1991	Single, non-reproducing
	1992	Family (3 individuals), reproducing
	1994	Pair, non-reproducing
	1995	Single, unknown
	2000	Single, unknown
Surrounding vicinity (not in a PAC)	1991	Single, non-reproducing

#### Affected Habitat

The Mexican spotted owl (MSO) was listed as a threatened species in March of 1993. In March of 1995, the U.S. Fish and Wildlife Service prepared the Recovery Plan for the Mexican Spotted Owl. This recovery plan was revised by the U.S. Fish and Wildlife Service in December of 2012. MSOs occupy mixed conifer, ponderosa pine-Gambel oak, and riparian forest types, characterized by high canopy cover, high stem density, multi-layered canopies, large snags, and downed logs and woody material. They are also found in narrow, steep-walled canyons throughout its range.

The site of the log jam is within the northern boundary of the Yeager PAC and is directly adjacent to MSO recovery habitat on the northern side of FR 96, with portions of that recovery habitat designated specifically as roost/nest replacement habitat and foraging/non-breeding habitat. The nest/roost core



area within the Yeager PAC is 0.6 miles south of the log jam site. The habitat that will be affected by the proposed action, particularly ramp construction and debris removal, is characterized by relatively open-canopy forest and lacks the complex, multi-layered canopy that Mexican spotted owl typically prefers.

Table 2 and Figure 3 below indicate acres of MSO habitat within the action area. For determining effects to Mexican spotted owl and its habitat, the action area is defined as the combined acreage of the log jam removal and ramp construction site, Lockwood pit, the section of FR 96 used to transport debris from the log jam site to Lockwood pit and a 0.25 mile buffer around all of these areas to account for potential disturbance effects to MSO. The total acreage of this action area is 477.7 acres.

Table 2. Acres of Mexican spotted owl habitat within the action area

<b>MSO Habitat</b>	<b>Acres within Action Area</b>
Yeager PAC	74.52
Recovery Habitat - Total	56.35
Recovery Habitat – Nest/Roost Replacement	16.57
Recovery Habitat – Foraging, Non-Breeding	39.78

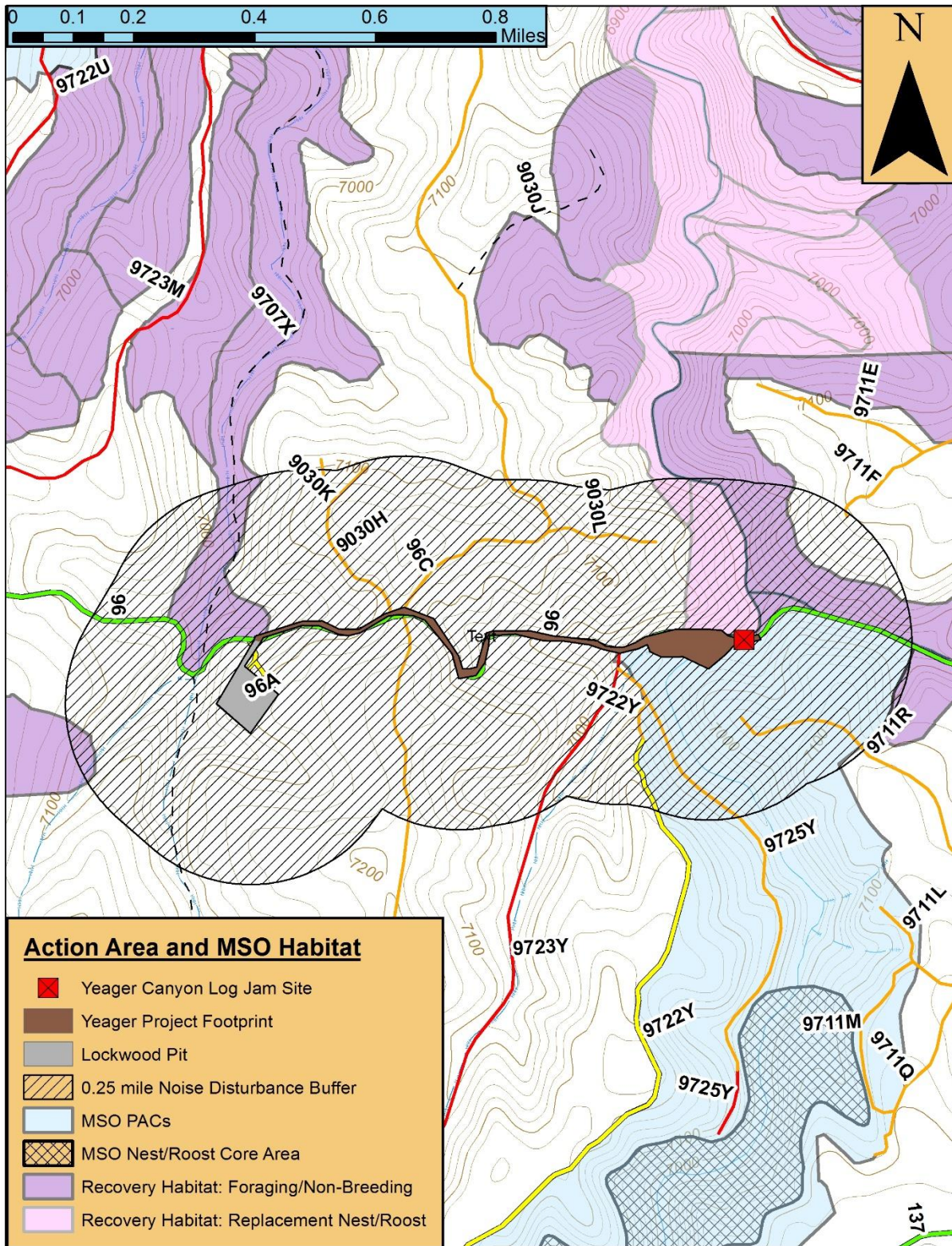


Figure 3. Mexican spotted owl habitat within the action area

### *Critical Habitat*

The proposed action will occur in 3.18 acres of designated Mexican spotted owl critical habitat. MSO critical habitat includes areas within mapped boundaries of protected and recovery habitat which have one or more primary constituent elements (PCEs). PCEs of non-canyon critical habitat for the Mexican spotted owl include the following:

(A) Primary constituent elements related to forest structure:

- (1) A range of tree species, including mixed conifer, pine-oak, and riparian forest types, composed of different tree sizes reflecting different ages of trees, 30 percent to 45 percent of which are large trees with a trunk diameter of 12 inches (0.3 meters) or more when measured at 4.5 feet (1.4 meters) from the ground;
- (2) A shade canopy created by the tree branches covering 40 percent or more of the ground; and
- (3) Large dead trees (snags) with a trunk diameter of at least 12 inches (0.3 meters) when measured at 4.5 feet (1.4 meters) from the ground.

(B) Primary constituent elements related to maintenance of adequate prey species:

- (1) High volumes of fallen trees and other woody debris;
- (2) A wide range of tree and plant species, including hardwoods; and
- (3) Adequate levels of residual plant cover to maintain fruits, seeds, and allow plant regeneration (USFWS 2012).

### *Analysis of Effects*

#### *Mexican Spotted Owl & Its Habitat*

The Mexican spotted owl habitat that will be affected by the proposed action is characterized by relatively open-canopy forest directly adjacent to FR 96, a well-traveled forest road. Given the greater potential for Mexican spotted owl to be detected by predators in this open-canopy habitat and the frequent exposure to vehicle traffic, this habitat should be considered of low quality for MSO. Nevertheless, this habitat contains herbaceous undergrowth which could provide cover for a variety of MSO prey species. Ramp construction and removal of woody debris at the log jam site will create ground disturbance effects and thus reduce herbaceous groundcover for an estimated 1-3 years. Consequently, effects to this area could reduce the quality of foraging habitat for MSO.

However, given the minimal footprint of these effects (3.18 acres within the 624.46-acre Yeager PAC) and the short-term (1-3 year) reduction in herbaceous groundcover, these effects are not likely to significantly reduce foraging habitat quality. Observing the mitigations as outlined below will diminish or eliminate most of these effects within 1-3 years of project implementation.

Implementation of the proposed action will likely require the trimming and/or removal of box elders present on either side of the culvert at the intersection of FR 96 and Yeager Canyon as well as the removal of up to five other trees < 18" diameter at breast height (DBH) per management recommendations in the Mexican spotted owl Recovery Plan, First Revision (USFWS 2012) in order to construct the ramp. These effects will be limited to a 3.18-acre footprint within the northern boundary of the 624.46-acre Yeager PAC.



The proposed action will likely require the use of heavy equipment to transport woody debris from the log jam site along FR 96 to Lockwood pit (a rock quarry), where the woody debris will be piled. Transporting the woody debris on FR 96 with heavy equipment may increase the risk of collision with Mexican spotted owl but given the limited speed at which the heavy equipment will be traveling ( $\leq 10$  mph), the risk is minimal.

Any wood piles created in Lockwood pit would be subject to burning. This activity would not occur during the MSO breeding season and will have no effect on breeding owls. Due to the limited size of any wood piles created and the 0.4-mile distance to the nearest MSO PAC (Quail Springs PAC), the anticipated smoke effects to Mexican spotted owls roosting in the vicinity will be minimal.

No disturbance effects are anticipated for breeding owls as the proposed action will occur outside the breeding season (March 1<sup>st</sup>-August 31<sup>st</sup>). No disturbance effects are anticipated in the nest/roost core of the Yeager PAC, which is 0.6 miles from the log jam site. Additionally, the proposed action would occur during daylight hours and would not be expected to interfere with Mexican spotted owl foraging behavior. Potential disturbance effects from human presence and the noise of heavy equipment operation to roosting owls outside the breeding season are anticipated in 130.87 acres of designated MSO habitat (74.52 acres within the Yeager PAC and 56.35 acres within MSO recovery habitat – see Table 2 and Figure 3). Given the expected short-term duration of the proposed action, these effects will be insignificant.

Beyond the short-term nature and minimal footprint of the effects anticipated for the proposed action, it is worth mentioning the potential for much more significant adverse effects to Mexican spotted owl and its habitat if the proposed action is not implemented. As outlined in the project background, FR 96 is a critical access route to the southeastern quadrant of the Mogollon Rim Ranger District for wildland firefighting resources and other forest management resources, especially given the current closure of nearby FR 95. If the proposed action were not implemented, and FR 96 were to become impassable at Yeager Canyon as a result, the potential for catastrophic wildfires to develop and adversely affect owls and their habitat increases significantly. Without forest access via FR 96, wildland firefighting resource response times would increase by 1-3 hours to a quadrant of the ranger district that contains nearly 20 MSO PACs.

#### Critical Habitat

The proposed action will likely affect the range of tree species and impact canopy cover within the project area, two of the three primary constituent elements of MSO critical habitat related to forest structure, and will, therefore, likely affect forest structure within the project area.

Furthermore, the express purpose of the proposed action is to reduce the “high volume of fallen trees and other woody debris” and will thus affect one of the primary constituent elements of MSO critical habitat related to the maintenance of adequate prey species. Ramp construction and woody debris removal will also reduce “levels of residual plant cover... [that] allow plant regeneration” via ground disturbance effects. Accordingly, the proposed action will likely affect two of the three primary constituent elements of MSO critical habitat related to the maintenance of adequate prey species.

Nonetheless, given the minimal footprint of these effects on PCEs of critical habitat (estimated at 3.18 acres within the 624.46-acre Yeager PAC) and the short-term (1-3 year) impact on herbaceous groundcover, these effects are not considered to significantly impact the value of the Yeager PAC as MSO critical habitat. The 3.18 acres of critical habitat subject to these effects is currently characterized by canopy cover of <40% and lacks a complex, multi-layered canopy. Thus, it is relatively low-quality



MSO habitat. Additionally, implementation of the recommended mitigations as outlined below will significantly reduce or eliminate most of these effects within 1-3 years of project implementation.

### Cumulative Effects

Because there are no future state or private actions expected to occur within the action area, cumulative effects are not anticipated for the Mexican spotted owl, its habitat or Mexican spotted owl critical habitat.

### Determination of Effects and Recommended Mitigations

The proposed action will likely result in small-scale and short-term effects to Mexican spotted owl, its habitat and MSO critical habitat. The anticipated effects are: removal of box elders on either side of the culvert at the intersection of FR 96 and Yeager Canyon, removal of up to five other trees of < 18" DBH, a reduction in herbaceous ground cover and a reduction in the volume of fallen trees and woody debris in MSO critical habitat. These effects are primarily due to ramp construction and the woody debris removal required for successful project implementation. The consequences of these effects would likely result in lower-quality foraging habitat for Mexican spotted owls within 3.18 acres of the 624.46-acre Yeager PAC. To mitigate these effects and disturbances, several measures will be observed:

- When determining ramp location and orientation, retention of hardwoods, larger trees and large snags will be emphasized to mitigate effects to riparian forest structure and stream channel structure. However, it is understood that up to 5 trees of < 18" DBH may be removed.
- When removing downed woody debris from the upstream (southern) side of the intersection of Yeager Canyon and FR 96, it is recommended that some of this woody debris be placed downstream of the intersection (on the other side of the culvert). Although this would still result in a reduction in the volume of fallen trees and woody debris within the Yeager PAC, this effect would be mitigated by increasing the volume of large woody debris within the designated recovery habitat just north of the project area.
- To minimize the risk for heavy equipment to collide with Mexican spotted owl when traveling between the log-jam site and Lockwood pit, heavy equipment will travel at a speed ≤10 mph
- As mentioned in the project proposal, after project implementation, ground disturbance effects (and subsequent loss of herbaceous groundcover) due to ramp construction and debris removal will be mitigated by scarifying compacted soil outside of the stream channel, reseeding the disturbed soil with native grasses and placement of slash/woody debris on the ramp surface to cover and protect the disturbed soil and promote the growth of herbaceous groundcover.
- To minimize potential disturbance to breeding Mexican spotted owls, project activities will not occur during the breeding season.

In applying these mitigations, implementation of Yeager Canyon log jam removal-related activity ***may affect, but is not likely to adversely affect, the Mexican spotted owl and its habitat.*** Likewise, in applying these mitigations, implementation of Yeager Canyon log jam removal-related activity ***may affect, but is not likely to adversely affect, PCEs of critical habitat for the Mexican spotted owl.***

### Consultation History

The consultation history for this project consists of discussions between Darrin Touv, Jeff Thumm, Matt O'Neill, and Shaula Hedwall in 2019. Discussions included potential actions, effects, and species effect determinations.

## Literature Cited

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